



# **Generic Environmental Impact Statement for License Renewal of Nuclear Plants**

**Supplement 28**

**Regarding  
Oyster Creek Nuclear Generating Station**

**Draft Report for Comment**

**U.S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
Washington, DC 20555-0001**



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## **Supplement 28**

### **Regarding Oyster Creek Nuclear Generating Station**

### **Draft Report for Comment**

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**Division of License Renewal  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001**



## **COMMENTS ON DRAFT REPORT**

Any interested party may submit comments on this report for consideration by the NRC staff. Comments may be accompanied by additional relevant information or supporting data. Please specify the report number NUREG-1437, Supplement 28, draft, in your comments, and send them by September 8, 2006, to the following address:

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Electronic comments may be submitted to the NRC by the Internet at [OysterCreekEIS@nrc.gov](mailto:OysterCreekEIS@nrc.gov).

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# Abstract

The U.S. Nuclear Regulatory Commission (NRC) considered the environmental impacts of renewing nuclear power plant operating licenses (OLs) for a 20-year period in its *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2, and codified the results in Title 10, Part 51, of the *Code of Federal Regulations* (10 CFR Part 51). In the GEIS (and its Addendum 1), the NRC staff identifies 92 environmental issues and reaches generic conclusions related to environmental impacts for 69 of these issues that apply to all plants or to plants with specific design or site characteristics. Additional plant-specific review is required for the remaining 23 issues. These plant-specific reviews are to be included in a supplement to the GEIS.

This Draft Supplemental Environmental Impact Statement (SEIS) has been prepared in response to an application submitted to the NRC by AmerGen Energy Company, LLC (AmerGen), to renew the OL for Oyster Creek Nuclear Generating Station (OCNGS) for an additional 20 years under 10 CFR Part 54. This draft SEIS includes the NRC staff's analysis that considers and weighs the environmental impacts of the proposed action, the environmental impacts of alternatives to the proposed action, and mitigation measures available for reducing or avoiding adverse impacts. It also includes the NRC staff's preliminary recommendation regarding the proposed action.

Regarding the 69 issues for which the GEIS reached generic conclusions, neither AmerGen nor the NRC staff has identified information that is both new and significant for any issue that applies to OCNGS. In addition, the NRC staff determined that information provided during the scoping process did not call into question the conclusions in the GEIS. Therefore, the NRC staff concludes that the impacts of renewing the OCNGS OL would not be greater than the impacts identified for these issues in the GEIS. For each of these issues, the NRC staff's conclusion in the GEIS is that the impact is of SMALL<sup>(a)</sup> significance (except for collective offsite radiological impacts from the fuel cycle and high-level waste and spent fuel, which were not assigned a single significance level).

Regarding the remaining 23 issues, those that apply to OCNGS are addressed in this draft SEIS. For each applicable issue, the NRC staff concludes that the significance of the potential environmental impacts of renewal of the OL is SMALL. The NRC staff also concludes that additional mitigation measures are not likely to be sufficiently beneficial as to be warranted. The NRC staff determined that information provided during the scoping process did not identify any new issue that has a significant environmental impact.

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<sup>a</sup>Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

## Abstract

1 The NRC staff's preliminary recommendation is that the Commission determine that the  
2 adverse environmental impacts of license renewal for OCNGS are not so great that preserving  
3 the option of license renewal for energy-planning decisionmakers would be unreasonable. This  
4 recommendation is based on (1) the analysis and findings in the GEIS; (2) the Environmental  
5 Report submitted by AmerGen; (3) consultation with Federal, State, and local agencies; (4) the  
6 NRC staff's own independent review; and (5) the NRC staff's consideration of public comments  
7 received during the scoping process.  
8

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# Executive Summary

By letter dated July 22, 2005, AmerGen Energy Company, LLC (AmerGen), submitted an application to the U.S. Nuclear Regulatory Commission (NRC) to renew the operating license (OL) for Oyster Creek Nuclear Generating Station (OCNGS) for an additional 20-years. If the OL is renewed, State regulatory agencies and AmerGen will ultimately decide whether the plant will continue to operate based on factors such as the need for power or other matters within the State's jurisdiction or the purview of the owners. If the OL is not renewed, then the plant must be shut down at or before the expiration date of the current OL, which is April 9, 2009. Should the NRC staff's license renewal review not be completed by this date, the plant may continue to operate past that date until the NRC staff has taken final action to either approve or deny the license renewal.

The NRC has implemented Section 102 of the National Environmental Policy Act (NEPA), Title 42, Section 4321, of the *United States Code* (42 USC 4321) in Title 10, Part 51, of the *Code of Federal Regulations* (10 CFR Part 51). In 10 CFR 51.20(b)(2), the Commission requires preparation of an Environmental Impact Statement (EIS) or a supplement to an EIS for renewal of a reactor OL. In addition, 10 CFR 51.95(c) states that the EIS prepared at the OL renewal stage will be a supplement to the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2.<sup>(a)</sup>

Upon acceptance of the AmerGen application, the NRC began the environmental review process described in 10 CFR Part 51 by publishing a Notice of Intent to prepare an EIS and conduct scoping. The NRC staff visited the OCNGS site in October 2005 and held public scoping meetings on November 1, 2005, in Toms River, New Jersey. In the preparation of this draft Supplemental Environmental Impact Statement (SEIS) for OCNGS, the NRC staff reviewed the AmerGen Environmental Report (ER) and compared it with the GEIS, consulted with other agencies, conducted an independent review of the issues following the guidance set forth in NUREG-1555, Supplement 1, the *Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal*, and considered the public comments received during the scoping process. The public comments received during the scoping process that were considered to be within the scope of the environmental review are provided in Appendix A, Part 1, of this draft SEIS.

The NRC staff will hold two public meetings in Toms River, New Jersey, in July 2006, to describe the preliminary results of the NRC environmental review, to answer questions, and to provide members of the public with information to assist them in formulating comments on this draft SEIS. When the comment period ends, the NRC staff will consider and address all of the

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<sup>a</sup>The GEIS was originally issued in 1996. Addendum 1 to the GEIS was issued in 1999. Hereafter, all references to the "GEIS" include the GEIS and its Addendum 1.

## Executive Summary

1 comments received. These comments will be addressed in Appendix A, Part 2, of the  
2 final SEIS.

3  
4 This draft SEIS includes the NRC staff's preliminary analysis that considers and weighs the  
5 environmental effects of the proposed action, the environmental impacts of alternatives to the  
6 proposed action, and mitigation measures for reducing or avoiding adverse effects. It also  
7 includes the NRC staff's preliminary recommendation regarding the proposed action.

8  
9 The Commission has adopted the following statement of purpose and need for license renewal  
10 from the GEIS:

11  
12 The purpose and need for the proposed action (renewal of an operating license) is to  
13 provide an option that allows for power generation capability beyond the term of a current  
14 nuclear power plant operating license to meet future system generating needs, as such  
15 needs may be determined by State, utility, and, where authorized, Federal (other than NRC)  
16 decisionmakers.

17  
18 The evaluation criterion for the NRC staff's environmental review, as defined in  
19 10 CFR 51.95(c)(4) and the GEIS, is to determine

20  
21 . . . whether or not the adverse environmental impacts of license renewal are so great that  
22 preserving the option of license renewal for energy-planning decisionmakers would be  
23 unreasonable.

24  
25 Both the statement of purpose and need and the evaluation criterion implicitly acknowledge that  
26 there are factors, in addition to license renewal, that will ultimately determine whether an  
27 existing nuclear power plant continues to operate beyond the period of the current OL.

28  
29 NRC regulations [10 CFR 51.95(c)(2)] contain the following statement regarding the content of  
30 SEISs prepared at the license renewal stage:

31  
32 The supplemental environmental impact statement for license renewal is not required to  
33 include discussion of need for power or the economic costs and economic benefits of the  
34 proposed action or of alternatives to the proposed action except insofar as such benefits  
35 and costs are either essential for a determination regarding the inclusion of an alternative in  
36 the range of alternatives considered or relevant to mitigation. In addition, the supplemental  
37 environmental impact statement prepared at the license renewal stage need not discuss  
38 other issues not related to the environmental effects of the proposed action and the  
39 alternatives, or any aspect of the storage of spent fuel for the facility within the scope of the  
40 generic determination in § 51.23(a) ["Temporary storage of spent fuel after cessation of

reactor operation—generic determination of no significant environmental impact”] and in accordance with § 51.23(b).

The GEIS contains the results of a systematic evaluation of the consequences of renewing an OL and operating a nuclear power plant for an additional 20 years. It evaluates 92 environmental issues using the NRC’s three-level standard of significance – SMALL, MODERATE, or LARGE – developed using the Council on Environmental Quality guidelines. The following definitions of the three significance levels are set forth in footnotes to Table B-1 of 10 CFR Part 51, Subpart A, Appendix B:

SMALL – Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE – Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

For 69 of the 92 issues considered in the GEIS, the analysis in the GEIS reached the following conclusions:

- (1) The environmental impacts associated with the issue have been determined to apply either to all plants or, for some issues, to plants having a specific type of cooling system or other specified plant or site characteristics.
- (2) A single significance level (i.e., SMALL, MODERATE, or LARGE) has been assigned to the impacts (except for collective offsite radiological impacts from the fuel cycle and from high-level waste and spent fuel disposal).
- (3) Mitigation of adverse impacts associated with the issue has been considered in the analysis, and it has been determined that additional plant-specific mitigation measures are not likely to be sufficiently beneficial to warrant implementation.

These 69 issues were identified in the GEIS as Category 1 issues. In the absence of new and significant information, the NRC staff relied on conclusions as amplified by supporting information in the GEIS for issues designated as Category 1 in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B.

Of the 23 issues that do not meet the criteria set forth above, 21 are classified as Category 2 issues requiring analysis in a plant-specific supplement to the GEIS. The remaining two issues,

## Executive Summary

environmental justice and chronic effects of electromagnetic fields, were not categorized. Environmental justice was not evaluated on a generic basis and must be addressed in a plant-specific supplement to the GEIS. Information on the chronic effects of electromagnetic fields was not conclusive at the time the GEIS was prepared.

This draft SEIS documents the NRC staff's consideration of all 92 environmental issues identified in the GEIS. The NRC staff considered the environmental impacts associated with alternatives to license renewal and compared the environmental impacts of license renewal and the alternatives. The alternatives to license renewal that were considered include the no-action alternative (not renewing the OL for OCNGS) and alternative methods of power generation. Based on projections made by the U.S. Department of Energy's Energy Information Administration, gas- and coal-fired generation appear to be the most likely power-generation alternatives if the power from OCNGS is replaced. These alternatives are evaluated assuming that the replacement power-generation plant is located at either the OCNGS site or at some other unspecified alternate location. In response to draft conditions presented in the proposed New Jersey Pollutant Discharge Elimination System permit issued in July 2005, the NRC staff also considered the environmental impacts of alternatives to the existing once-through cooling-water system employed at OCNGS.

AmerGen and the NRC staff have established independent processes for identifying and evaluating the significance of any new information on the environmental impacts of license renewal. Neither AmerGen nor the NRC staff has identified information that is both new and significant related to Category 1 issues that would call into question the conclusions in the GEIS. Similarly, neither the scoping process nor the NRC staff has identified any new issue applicable to OCNGS that has a significant environmental impact. Therefore, the NRC staff relies upon the conclusions of the GEIS for all of the Category 1 issues that are applicable to OCNGS.

AmerGen's license renewal application presents an analysis of the Category 2 issues. The NRC staff has reviewed the AmerGen analysis for each issue and has conducted an independent review of each issue. Six Category 2 issues are not applicable because they are related to plant design features or site characteristics not found at OCNGS. Four Category 2 issues are not discussed in this draft SEIS because they are specifically related to refurbishment. AmerGen has stated that its evaluation of structures and components, as required by 10 CFR 54.21, did not identify any major plant refurbishment activities or modifications as necessary to support the continued operation of OCNGS for the license renewal period. In addition, any replacement of components or additional inspection activities are within the bounds of normal plant operation and are not expected to affect the environment outside of the bounds of the plant operations evaluated in the U.S. Atomic Energy Commission's 1974 *Final Environmental Statement Related to Operation of Oyster Creek Nuclear Generating Station, Jersey Central Power and Light Company*.

Eleven Category 2 issues related to operational impacts and postulated accidents during the renewal term, as well as environmental justice and chronic effects of electromagnetic fields, are discussed in detail in this draft SEIS. Four of the Category 2 issues and environmental justice apply to both refurbishment and to operation during the renewal term and are only discussed in this draft SEIS in relation to operation during the renewal term. For all 11 Category 2 issues and environmental justice, the NRC staff concludes that the potential environmental effects are of SMALL significance in the context of the standards set forth in the GEIS. In addition, the NRC staff determined that appropriate Federal health agencies have not reached a consensus on the existence of chronic adverse effects from electromagnetic fields. Therefore, no further evaluation of this issue is required. For severe accident mitigation alternatives (SAMAs), the NRC staff concludes that a reasonable, comprehensive effort was made to identify and evaluate SAMAs. Based on its review of the SAMAs for OCNGS and the plant improvements already made, the NRC staff concludes that several SAMAs are potentially cost-beneficial. However, none of these SAMAs relate to adequately managing the effects of aging during the period of extended operation. Therefore, they need not be implemented as part of license renewal pursuant to 10 CFR Part 54.

Mitigation measures were considered for each Category 2 issue. Current measures to mitigate the environmental impacts of plant operation were found to be adequate, and no additional mitigation measures were deemed sufficiently beneficial to be warranted. Nevertheless, additional mitigation may be required by the State of New Jersey that would result in further reduction of impacts related to cooling-system operation.

Cumulative impacts of past, present, and reasonably foreseeable future actions were considered, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. For purposes of this analysis, where OCNGS license renewal impacts are deemed to be SMALL, the NRC staff concluded that these impacts would not result in significant cumulative impacts on potentially affected resources.

If the OCNGS OL is not renewed and the plant ceases operation on or before the expiration of its current OL, then the adverse impacts of likely alternatives would not be smaller than those associated with continued operation of OCNGS. The impacts may, in fact, be greater in some areas.

The preliminary recommendation of the NRC staff is that the Commission determine that the adverse environmental impacts of license renewal for OCNGS are not so great that preserving the option of license renewal for energy-planning decisionmakers would be unreasonable. This recommendation is based on (1) the analysis and findings in the GEIS; (2) the ER submitted by AmerGen; (3) consultation with other Federal, State, and local agencies; (4) the NRC staff's own independent review; and (5) the NRC staff's consideration of public comments received during the scoping process.



# Abbreviations/Acronyms

°	degree
μCi	microcurie(s)
μg	microgram(s)
μm	micrometer(s)
μSv	microsievert(s)
ac	acre(s)
AC	alternating current
ACC	averted cleanup and decontamination costs
AD	Anno Domini
ADAMS	Agencywide Documents Access and Management System
AEA	Atomic Energy Act
AEC	U.S. Atomic Energy Commission
ALARA	as low as reasonably achievable
AmerGen	AmerGen Energy Company, LLC
AOC	averted offsite property damage costs
AOE	averted occupational exposure
AOSC	averted onsite costs
APE	averted public exposure
AQCR	Air Quality Control Region
ASME	American Society of Mechanical Engineers
ASMFC	Atlantic States Marine Fisheries Commission
ATWS	anticipated transient without scram
ATV	all-terrain vehicle
BA	Biological Assessment
BBNEP	Barneget Bay National Estuary Program
BC	Before Christ
Bq	becquerel(s)
BO	Biological Opinion
Btu	British thermal unit(s)
BWR	boiling-water reactor
BWROG	Boiling-Water Reactor Owners Group
C	Celsius
CAA	Clean Air Act
CAFRA	Coastal Area Facility Review Act
CCC	Caribbean Conservation Corporation
CCW	component cooling water
CDF	core damage frequency or combined disposal facility

## Abbreviations/Acronyms

CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Ci	curie(s)
cm	centimeter(s)
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
COE	cost of enhancement
CPC	Center for Plant Conservation
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
d	day
DBA	design-basis accident
DC	direct current
DDT	dichloro-diphenyl-trichloroethane
DOC	U.S. Department of Commerce
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DOL	U.S. Department of Labor
DOT	U.S. Department of Transportation
DPR	demonstration project reactor
DSM	demand-side management
EA	environmental assessment
EFH	essential fish habitat
EIA	Energy Information Administration
EIS	Environmental Impact Statement
ELF-EMF	extremely low frequency-electromagnetic field
EPA	U.S. Environmental Protection Agency
ER	Environmental Report
ESA	Endangered Species Act
ESMP	Environmental Surveillance and Monitoring Program
Exelon	Exelon Corporation
F	Fahrenheit
FAA	Federal Aviation Administration
FES	Final Environmental Statement
FPRA	Fire Probabilistic Risk Assessment
FR	Federal Register
FSAR	Final Safety Analysis Report



## Abbreviations/Acronyms

ft	foot (feet)
FWS	U.S. Fish and Wildlife Service
g	gram(s)
gal	gallon(s)
GEIS	Generic Environmental Impact Statement for License Renewal of Nuclear Plants, NUREG-1437
GL	Generic Letter
gpd	gallon(s) per day
gpm	gallon(s) per minute
GPU	General Public Utilities
GPUE	GPU Energy
HEPA	high-efficiency particulate air
HLW	high-level waste
hp	horsepower
hr	hour(s)
Hz	Hertz
IEEE	Institute of Electrical and Electronic Engineers
in.	inch(es)
INEEL	Idaho National Engineering and Environmental Laboratory
IPE	Individual Plant Examination
IPEEE	Individual Plant Examination of External Events
ISLOCA	interfacing systems loss-of-coolant accident
ISRA	Industrial Site Recovery Act
ITS	Incidental Take Statement
J	joule(s)
JCP&L	Jersey Central Power & Light Company
kg	kilogram(s)
km	kilometer(s)
kV	kilovolt(s)
kW	kilowatt(s)
kWh	kilowatt hour(s)
L	liter(s)
lb	pound(s)
LERF	large early release frequency
LLTF	Lessons Learned Task Force

## Abbreviations/Acronyms

LOCA	loss-of-coolant accident
LOOP	loss of offsite power
m	meter(s)
m <sup>2</sup>	square meter(s)
m <sup>3</sup>	cubic meter(s)
mA	milliampere(s)
MAAP	Modular Accident Analysis Program
MACCS2	Melcor Accident Consequence Code System 2
MAFMC	Mid-Atlantic Fishery Management Council
MDOC	Maine Department of Conservation
MEI	maximally exposed individual
mg	milligram(s)
mi	mile(s)
mi <sup>2</sup>	square mile(s)
min	minute(s)
mL	milliliter(s)
mm	millimeter(s)
MMACR	modified maximum averted cost risk
MMSC	Marine Mammal Stranding Center
mph	mile(s) per hour
mrad	millirad(s)
mrem	millirem(s)
mSv	millisievert(s)
MT	metric ton(s) (or tonne[s])
MTBE	methyl tertiary-butyl ether
MTU	metric ton(s)-uranium
MW	megawatt(s)
MWd	megawatt-day(s)
MW(e)	megawatt(s) electric
MW(t)	megawatt(s) thermal
MWh	megawatt hour(s)
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	National Academy of Sciences
NCES	National Center for Educational Statistics
NEPA	National Environmental Policy Act
NESC	National Electric Safety Code
NFSC	Northeast Fisheries Science Center
ng	nanogram(s)

## Abbreviations/Acronyms

NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NJAC	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
NJONLM	New Jersey Office of Natural Lands Management
NJPDES	New Jersey Pollutant Discharge Elimination System
NJWSA	New Jersey Water Supply Administration
NMFS	National Marine Fisheries Service
NO <sub>x</sub>	nitrogen oxide(s)
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NREL	National Renewable Energy Laboratory
NWPPC	Northwest Power Planning Council
OCDP	Ocean County Department of Planning
OCNGS	Oyster Creek Nuclear Generating Station
OCPB	Ocean County Planning Board
ODCM	Offsite Dose Calculation Manual
OL	operating license
ONJSC	Office of New Jersey State Climatologist
PA	Preliminary Assessment
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
pCi	picocurie(s)
PL	Public Law
PM <sub>2.5</sub>	particulate matter, 2.5 microns or less in diameter
PM <sub>10</sub>	particulate matter, 10 microns or less in diameter
PNNL	Pacific Northwest National Laboratory
ppm	part(s) per million
ppt	part(s) per thousand
PRA	Probabilistic Risk Assessment
PSA	Probabilistic Safety Assessment
PSD	Prevention of Significant Deterioration
RAI	request for additional information
REMP	radiological environmental monitoring program
RG	Regulatory Guide
RI	Remedial Investigation
ROI	region of interest

## Abbreviations/Acronyms

RPC	replacement power cost
rpm	revolution(s) per minute
RRW	risk reduction worth
s	second(s)
SAMA	Severe Accident Mitigation Alternative
SAR	Safety Analysis Report
SAV	submerged aquatic vegetation
SCR	selective catalytic reduction
SECA	Solid State Energy Conservation Alliance
SEIS	Supplemental Environmental Impact Statement
SER	Safety Evaluation Report
SERI	Systems Energy Resources, Inc.
SHPO	State Historic Preservation Office
SI	Site Investigation
SJRCDC	South Jersey Resource Conservation and Development Council
SO <sub>2</sub>	sulfur dioxide
SO <sub>x</sub>	sulfur oxide(s)
Sv	sievert
TDS	total dissolved solids
TEL	threshold effect level
TLAA	time-limited aging analysis
TS	technical specification
TSS	total suspended solids
UFSAR	Updated Final Safety Analysis Report
URSGWC	URS Greiner Woodward Clyde
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
VAC	volts alternating current
VOC	volatile organic compound
W	watt(s)
yr	year(s)